

ES&H Coordinator's Meeting

**Rigging Incident
LHC Magnet
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Incident Description

On the morning of August 29, 2001, a dipole magnet being built for the Large Hadron Collider (LHC) program at CERN was dropped in Building 902 while being rigged due to a sling failure.

Magnet Description

■ Weight ~ 11,000 lbs

■ Diameter ~ 24 in



■ Length ~ 40 ft

Rigging Configuration

- Magnet was rigged at 25° using two slings
 - 16 ft
 - 21,200 lbs.
 - Sling tension – 12,000 lbs each
- Anti-chafing protection required
 - Fiducial Support Brackets
 - Not used for RHIC magnets
 - 3 of 4 points used cut sections of fire hose
 - 1 point used Styrofoam packing material
 - Folded over many times and taped



Incident Set-up

- First production magnet rigged without incident
- When moving #2 from the insertion station to inspection table, load was stopped and suspended so vacuum plates could be bolted on
 - 3 plates located on bottom of magnet assembly
 - Violates standard practice and training on working on suspended loads
 - Procedure clearly states to place magnet on table prior to attaching plates

Incident

- Without warning, east sling let go
 - Recoil force moved bridge crane immediately, causing opposite side to strike ground.
 - Personnel were able to move away from magnet without any injury.

Incident Investigation

- Crane locked out immediately
 - SE notified and investigated with Facility Safety and Plant Engineering.
 - Sling showed signs of significant cutting
 - Styrofoam material cut through
 - Fire hose not damaged



Incident Documentation

- BNL Critique Performed on 30 August, 2001
 - SHSD, PE, IO, F&O, SMD personnel attended
 - CH-BH-BNL-BNL-2001-0023
- ORPS Reportable due to Near Miss
 - Potential Fatalities
 - Price of repairs to magnet
 - CH-BH-BNL-BNL-2001-0023

Findings

■ Material Selection/Failure:

- Styrofoam material did not provided adequate protection from chafing

■ Procedure/Design:

- Load had a design feature which caused a chafe point but local procedures did not give specific guidance for rigging.
 - Use of a spreader bar to eliminate chafing issue
 - Identification of suitable anti-chafing material

■ Personnel:

- Assembly procedures clearly stated that load should be resting when attaching covers.

Findings

■ Training:

- Personnel had current crane training and SAC for Crane Involved
- No SMD personnel had taken the BNL Basic Rigging Course (GST 155), geared for personnel who perform rigging evaluations

BNL Training covers the need for anti-chafing protection but neither class identifies specific materials to use!

Actions Completed

- SMD published rigging policy.
 - Only commercially obtained or Engineering approved material to be used for anti-chafing protection.
 - If anti-chafing protection is needed, the load will be lifted and lowered and checked to verify if protection is working as expected.
 - Prior to using Anti-chafing protection, the rigging shall be evaluated to see if other approved devices (i.e., spreader bars) can be used to preclude the need.

Actions Completed

- JTAs for supervisory personnel (how routinely rig) revised to include the BNL Basic Rigging Course (GST 155).
- Review of SMD procedures for issues with personnel working on suspended loads
 - Identified 3 instances
 - Change procedure/added tooling.

**DON'T ALLOW PERSONNEL TO WORK
UNDER SUSPENDED LOADS!**

Future Actions

- Provide lab-wide standard for anti-chafing material select in revised BNL Basic Rigging Course (GST 155).
- Publish lab wide Lesson Learn on incident.